

## Claims

What is claimed is:

- 1 1. A method for allocating a resource, comprising the steps of:
  - 2 (a) receiving a resource allocation request from a client;
  - 3 (b) imposing on said client a computational task and a time limit for correct
  - 4 completion of said computational task;
  - 5 (c) receiving verification that said client has correctly performed said
  - 6 computational task within said time limit; and
  - 7 (d) allocating said resource for said client if the verification is received.
- 1 2. The method of claim 1 wherein said resource allocation request comprises a  
2 network connection request.
- 1 3. The method of claim 1 wherein said step (b) comprises communicating a puzzle  
2 as at least a portion of said communication task.
- 1 4. The method of claim 3 wherein said step (b) comprises communicating the output  
2 of a one-way function to said client.
- 1 5. The method of claim 3 wherein said step (b) comprises communicating the output  
2 of a block cipher to said client.
- 1 6. The method of claim 3 wherein said step (b) comprises communicating the output  
2 of a function, wherein the input of said function is generated, based at least in part  
3 on a server secret unknown to said client, and not revealed through correct  
4 performance of said computational task.

- 1 7. The method of claim 3 wherein said step (b) comprises communicating the output  
2 of a function, wherein the input of said function comprises a timestamp and  
3 information authenticating the timestamp.
- 1 8. The method of claim 3 wherein said step (b) comprises communicating a puzzle  
2 constructed in a self authenticating fashion.
- 1 9. The method of claim 3 wherein said step (b) comprises communicating a hash  
2 image and a partially revealed pre-image to said client.
- 1 10. The method of claim 9 wherein said step (c) comprises receiving the remaining  
2 pre-image.
- 1 11. The method of claim 3 wherein said step (b) comprises communicating a plurality  
2 of sub-puzzles to a client.
- 1 12. The method of claim 11 wherein said step (b) comprises communicating a  
2 plurality of independently constructed sub-puzzles.
- 1 13. The method of claim 11 wherein said step (b) comprises communicating a  
2 plurality of sub-puzzles wherein each sub-puzzle is constructed with some  
3 intended overlap.
- 1 14. The method of claim 1 wherein said step (a) comprises receiving a TCP SYN  
2 request.
- 1 15. The method of claim 1 wherein said step (a) comprises receiving a request to open  
2 an SSL connection.
- 1 16. The method of claim 1 wherein said step (b) comprises the steps of:

- 2 (ba) determining if a computational task is to be imposed upon said client  
3 based upon the operating circumstances at the time of receiving said  
4 resource allocation request from said client; and  
5 (bb) if a computational task is determined to be imposed upon said client then  
6 selecting a computational task responsive to at least one characteristic of  
7 said operating circumstances at the time of receiving said resource  
8 allocation request; and  
9 (bc) if a computational task is determined to be imposed upon said client then  
10 imposing the selected computational task on said client.

1 17. The method of claim 1, wherein said step (a) comprises receiving a resource  
2 allocation request comprising a query, or accompanied or preceded by a query  
3 concerning whether a server is currently imposing computational tasks.

1 18. A method for procuring a resource comprising the steps of:  
2 (a) communicating a resource allocation request to a server;  
3 (b) receiving a computational task from said server;  
4 (c) performing or delegating the performance of said computational task  
5 correctly within a known time limit; and  
6 (d) communicating to said server a verification that said computational task  
7 has been performed correctly within the known time limit.

1 19. The method of claim 18 wherein said resource allocation request comprises a  
2 network connection request.

1 20. The method of claim 18 wherein said step (b) comprises receiving said  
2 computational task and a time limit for performance of said computational task  
3 from said server.

1 21. The method of claim 18 wherein said step (c) comprises solving a puzzle.

- 1 22. The method of claim 21 wherein said step (c) comprises a linear search of the  
2 solution space associated with said computational task.
- 1 23. The method of claim 18 wherein said step (c) comprises solving a plurality of  
2 sub-puzzles.
- 1 24. The method of claim 18 wherein said step (a) comprises transmitting a TCP SYN  
2 request.
- 1 25. The method of claim 18 wherein said step (a) comprises transmitting a request to  
2 open an SSL connection.
- 1 26. The method of claim 18 wherein said step (a) comprises transmitting a resource  
2 allocation request comprising a query, or accompanied or preceded by a query  
3 concerning whether a server is currently imposing computational tasks.
- 1 27. A apparatus for allocating a resource comprising:  
2 a first receiver receiving a resource allocation request from a client;  
3 a computational task generator for imposing a computational task upon said client  
4 for correct performance within a time limit; and  
5 a transmitter communicating said computational task to said client;  
6 a second receiver receiving a verification from said client that said  
7 computational task was correctly performed with said time limit; and  
8 an allocator allocating said resource for said client.
- 1 28. The apparatus of claim 27 wherein said first receiver and said second receiver  
2 comprise the same receiver.
- 1 29. The apparatus of claim 27 wherein said first receiver receives a resource  
2 allocation request comprising a network connection request.

- 1 30. The apparatus of claim 27 wherein said transmitter communicates said  
2 computational task and a time limit for performance of said computational task to  
3 said client;
- 1 31. The apparatus of claim 27 wherein said computational task comprises a puzzle.
- 1 32. The apparatus of claim 31 wherein said puzzle comprises the output of a one-way  
2 function.
- 1 33. The apparatus of claim 31 wherein said puzzle comprises the output of a block  
2 cipher.
- 1 34. The apparatus of claim 31 wherein said puzzle comprises the output of a function,  
2 wherein the input of said function is based at least in part on a server secret  
3 unknown to said client and not revealed through correct performance of said  
4 computational task.
- 1 35. The apparatus of claim 31 wherein said puzzle comprises the output of a function,  
2 wherein the input of said function comprises a timestamp and information  
3 authenticating the timestamp.
- 1 36. The apparatus of claim 31 wherein said puzzle is constructed in a self  
2 authenticating fashion.
- 1 37. The apparatus of claim 31 wherein said puzzle comprises a hash image, and a  
2 partially revealed pre-image.
- 1 38. The apparatus of claim 37 wherein said verification comprises verifying the  
2 remaining unrevealed pre-image.

- 1 39. The apparatus of claim 31 wherein said puzzle comprises a plurality of sub-  
2 puzzles.
- 1 40. The apparatus of claim 39 wherein said plurality of sub-puzzles are constructed  
2 independently.
- 1 41. The apparatus of claim 39 wherein said plurality of sub-puzzles are constructed  
2 with some intended overlap.
- 1 42. The apparatus of claim 27 wherein said resource allocation request comprises a  
2 TCP SYN request.
- 1 43. The apparatus of claim 27 wherein said resource allocation request comprises a  
2 request to open an SSL connection.
- 1 44. The apparatus of claim 27 wherein said computational task is selected responsive  
2 to at least one characteristic of the operating circumstances at the time of  
3 receiving said resource allocation request.
- 1 45. The apparatus of claim 27 wherein said resource allocation request comprises a  
2 query, or is accompanied or preceded by a query concerning whether a server is  
3 currently imposing computational tasks.
- 1 46. The apparatus of claim 27 comprising a time limit generator generating a  
2 time limit within which said client must correctly perform said  
3 computational task;
- 1 47. A apparatus for procuring a resource comprising:  
2 a first transmitter communicating a resource allocation request to a server;  
3 a first receiver receiving a computational task from said server;

4 a computational task solver correctly performing said computational task  
5 within a known time limit; and  
6 a second transmitter communicating to said server a verification that  
7 said computational task has been performed.

1 48. The apparatus of claim 47 wherein said first transmitter and said second  
2 transmitter comprise the same transmitter.

1 49. The method of claim 47 wherein said first transmitter sends a resource allocation  
2 request comprising a network connection request.

1 50. The apparatus of claim 47 further comprising a second receiver receiving a time  
2 limit for performing said computational task.

1 51. The apparatus of claim 50 wherein said first receiver and said second receiver  
2 comprise the same receiver.

1 52. The apparatus of claim 47 wherein said computational task comprises a puzzle.

1 53. The apparatus of claim 47 wherein said computational task performs a linear  
2 search of potentially the entire solution space associated with said computational  
3 task.

1 54. The apparatus of claim 47 wherein said computational task comprises a plurality  
2 of sub-puzzles

1 55. The apparatus of claim 54 wherein said sub-puzzles are constructed  
2 independently.

1 56. The apparatus of claim 54 wherein said sub-puzzles are constructed with some  
2 intended overlap.

1 57. The apparatus of claim 47 wherein said resource allocation request comprises a  
2 TCP SYN request.

1 58. The apparatus of claim 47 wherein said resource allocation request comprises a  
2 request to open an SSL connection.

1 59. The apparatus of claim 47 wherein said resource allocation request comprises a  
2 query, or is accompanied or preceded by a query concerning whether said server  
3 is currently imposing computational tasks.

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